Paper No. 38

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte
TAPANI J VUORINEN,
U. JOHANNA BUCHERT,
ANITA B.L. TELEMAN,
and T. MAIJA TENKANEN

Appeal No. 2001-2554
Application No. 08/925,321

ON BRIEF

Before OWENS, LIEBERMAN and POTEATE, Administrative Patent Judges.

LIEBERMAN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 1, 3 through 8 and 10 through 31 which are all the claims pending in this application.

THE INVENTION

The invention is directed to a method of treating cellulose pulp containing hexenuronic acid, wherein the amount of hexenuronic acid present therein is reduced by at least 50%. The process includes treating cellulosic pulp obtained by alkaline delignification at an acid pH and a temperature such that the reduction in hexenuronic acid is accomplished and the Kappa number is reduced by at least two units. Additional limitations are described in the following illustrative claim.

THE CLAIM

Claim 1 is illustrative of appellants' invention and is reproduced below.

1. A method of treating chemical cellulose pulp produced by alkaline delignification and having a kappa number of under 24, having hexenuronic acid therein, comprising the steps of:

(a) treating chemical cellulose pulp produced by alkaline delignification having a kappa number under 24 and at a solids consistency of between 0.1-50% by treating the pulp at a temperature over 85°C and at a pH between about 2-5 for sufficient time to remove at least 50% of the hexenuronic acid and to reduce the kappa number by at least 2 units; and

(b) bleaching the chemical cellulose pulp produced by alkaline delignification having a kappa number under 24 in at least one bleaching stage.

THE REFERENCES OF RECORD

As evidence of obviousness, the examiner relies upon the following references:

Lennart et al. (EP'695) 0,511,695 Nov. 04, 1992

Lachenal et al. (Lachenal) "Optimization of Bleaching Sequences Using Peroxide as First

Stage:" TAPPI, International Pulp Bleaching Conference, p. 145-151, 1982.

Marechal "Acid Extraction of the Alkaline Wood Pulps (Kraft or Soda/AQ) Before or During Bleaching Reason and Opportunity", Journal of Wood Chemistry and Technology, 13(2), p 261-281 (1993).

Admitted Prior Art, page 4, lines 13-22 of the instant specification.

THE REJECTION

Claims 1, 3 through 8 and 10 through 31 stand rejected under 35 U.S.C. §103(a) as being unpatentable over EP'695 in view of admitted prior art with or without Lachenal with or without Marechal.

OPINION

We have carefully considered all of the arguments advanced by the appellants and the examiner and agree with the appellants that the rejection of claims 1, 3 through 8, 10 through 26 and 29 through 31 under §103(a) is not well founded. Accordingly, we do not sustain the rejection of these claims. We agree with the examiner that the rejection of claims 27 and 28 is well founded. Accordingly, we affirm as to these claims.

The Rejection under § 103(a)

The examiner relies upon a combination of two or three references to reject the claimed subject matter and establish a prima facie case of obviousness. None of the references before us except for the "admitted prior art" is directed to the presence of

hexenuronic acid in chemical cellulose pulp let alone the presence of hexenuronic acid wherein at least 50% of the hexenuronic acid is removed by the process. The examiner relies upon the teaching at page 4, lines 13-22 of the instant specification as being admitted prior art which discloses the presence of hexenuronic acid. That section of the specification reads as follows:

> It is known that cellulose pulps contain 4-O-methyl-α-D-glucuronic acid groups (glucuronic acid groups). According to the invention it has been discovered that sulphate pulps also contain in addition to glucuronic acid groups, a significant amount of 4-deoxy-β-L-threo-hex-4-enopyranosyl uronic acid groups (i.e. hexenuronic acid groups) bound to xylan. The amount of hexenuronic acid in some pulps is even substantially greater than the amount of known glucuronic acid groups. The term "hexenuronic acid" as used in the present specification encompasses all 4-deoxy-β-L-threo-hex-4-enopyranosyl uronic acid groups.

Based upon the second sentence of the aforesaid paragraph which opens with the phrase, "[a]ccording to the invention," we cannot agree with the examiner's determination that this paragraph constitutes prior art. Nonetheless, a prima facie case of obviousness could have been established were the references of record to have inherently disclosed the claimed method such that the presence of hexenuronic acid was reduced by at least 50%.

In this respect EP'695 is directed to a process for bleaching lignocellulose pulp. See page 2, lines 43-47. We find that the lignocellulose pulp relates to chemical pulp according to the sulfate process. See page 3, lines 48-51. We find that the pulp has an initial Kappa number preferably from 10 up to 20. See page 3, lines 52-54. The acid treatment is carried out at a temperature between about 10 up to about 95°C and

preferably from 40 up to 80°C. See page 3, lines 55-56. We find that Example 1 utilizes a sulfate pulp having a Kappa number of 17. The pulp is acid treated at a pH of 2.0, and at a temperature of 60° C for 30 minutes. Additional treatments at a pH of 2.3 and 4.7 resulted in a Kappa number lower than the initial Kappa number by more than 2 Kappa units. See Table 1.

Each of the secondary references to Lachenal and Marechal are likewise directed to acid treatment of pulp. Lachenal discloses that, "the best sequence seems to be an AP sequence where the alkaline peroxide step is preceded by a hot (70° C) acid pretreatment." See page 147, left-hand column. Lachenal discloses that, "raising the temperature in the acid treatment results in a further decrease of Kappa No after the P stage." Id. We find that a temperature range of 20 to 90° C is disclosed in Table 4 for a time of 120 minutes, at a consistency of 12% utilizing 2% sulfuric acid. We concur with the findings in the first declaration of Vuorinen that 2% sulfuric acid results in a pH less than about 2.

Marechal discloses treating pulp having a Kappa number of 24.8 and a solids consistency within the range of 0.1 - 50% required by claim 1 at a pH of 2. See page 263. We find that the pH of the suspension was 2.18 and the suspension was heated for 2 hours at 95-100° C. See page 264.

With respect to the findings for each of the references alone or in combination, we determine that none of the references suggest or teach the inherency of the claimed hexenuronic acid reduction of at least 50% as required by the claimed subject matter.

Although under some disclosed conditions, any hexenuronic acid could have been reduced by 50% according to the teachings of the references of record, inherency requires that the characteristic must necessarily be present in the specific range required by the claimed subject matter. Stated otherwise inherency requires that the amount of hexenuronic acid present be reduced by at least 50% under the conditions disclosed in the references of record. It may not be established by probabilities or possibilities. Hence, the mere possibility that hexenuronic acid is reduced by 50% as required by the claimed subject matter is not sufficient to establish inherency. See In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); Ex parte Skinner, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986). Furthermore, the examiner must provide some evidence or scientific reasoning that the hexenuronic acid present in the processes of the prior art has in fact been reduced by the amount required by the claimed subject matter and hence is an inherent characteristic of the prior art processes. The record before us is silent with respect to any reduction in hexenuronic acid. Accordingly, the rejection of the examiner on the grounds of obviousness is reversed.

Because we reverse on this basis, we need not reach the issue of the sufficiency of the showing of unexpected results. In re Geiger, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987).

The Rejection of claims 27-28.

In contrast to each of the other independent claims on the record before us, claim

27 has no requirement for the reduction of hexenuronic acid which appellants have stated is ordinarily present in pulp. See specification, page 4. Accordingly, provided that the references of record disclose the method of claim 27, wherein each of the conditions is disclosed, a prima facie case of obviousness is established. In this respect we find that Table 4 at page 270 of Marechal treats cellulose pulp. We find that the initial pH is about 4, the actual pH being 4.13 wherein Marechal refers to the hydrolysis as being, "from dilute H_2SO_4 at 110°C, with H^+ concentration in the external liquid phase 100 times lower (pH ~ 4) than the one used with a buffer solution (pH ~ 2)." We further find that the final pH is 3.73 which is well within the scope of the claimed subject matter. We find that the initial Kappa number is 20.0 and is reduced to 12.2. We find that a temperature of 110°C is disclosed at a total hydrolysis time of 90 minutes. We find that an overall temperature range of 88 - 110° C is disclosed for times of 90-300 minutes. See Abstract, Table 4 and the disclosure in general. Inasmuch as the appellant discloses that typical treatment temperature and time includes "100°C about 0.5 to 4 hours." See specification page 10, line 5. We conclude that both the time and temperature fall within the scope of the claimed subject matter. It is well settled that optimization of time and temperature mode is a matter within the skill of the art. We conclude that control of time and temperature which is significant in the products being prepared both by the references of record and appellants is a result effective variable. It is well settled that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. See In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980);

In re Antonie, 559 F.2d 618, 620, 195 USPQ 6, 8-9 (CCPA 1977); and In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Accordingly, we conclude that the disclosure of Marechal is suggestive of the time and temperature requirements of the claimed subject matter. Our position is further supported by claim 28 depending from claim 27 which recites, "a temperature of between about 90-180°C."

As to step (b)of the claimed subject matter, as each of the references of record discloses bleaching the cellulose pulp, it would have been obvious to one of ordinary skill in the art to have bleached the pulp prepared in Table 4. Accordingly, we conclude that a prima facie case of obvious has been established.

The appellants' principal argument in rebuttal to the prima face case of obviousness is directed to the pulp yield % of o.d. pulp. It is appellants' position that the pulp yields are unacceptable. See paragraph 4, second declaration of Vuorinen. There is however, no evidence, or side by side comparative data disclosing that the appellants obtain larger pulp yields. We furthermore adopt the position of the examiner in response to the aforesaid declaration. See Answer, pages 7 and 8.

Accordingly, based on our consideration of the totality of the record before us, and having evaluated the prima facie case of obviousness in view of appellants' arguments and evidence, we conclude that the preponderance of evidence with respect to claims 27 through 28 weighs in favor of obviousness of the claimed subject matter within the meaning of § 103. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

Moreover, we do not consider our reliance primarily on the reference to Marechal to constitute a "new ground" of rejection. The issue, in this respect, is whether the appellant has had a fair opportunity to react to the thrust of the rejection. In re Kronig, 539 F.2d 1300, 1302-03, 190 USPQ 425, 426-27 (CCPA 1976).

DECISION

The rejection of claims 1, 3 through 8 and 10 through 26, and 29 through31 under 35 U.S.C. §103(a) as being unpatentable over EP'695 in view of admitted prior art with or without Lachenal with or without Marechal is reversed.

The rejection of claims 27 through 28 under 35 U.S.C. §103(a) as being unpatentable over EP'695 in view of admitted prior art with or without Lachenal with or without Marechal is affirmed.

The decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

TERRY J. OWENS
Administrative Patent Judge

PAUL LIEBERMAN
Administrative Patent Judge

LINDA R. POTEATE
Administrative Patent Judge

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